



SEQUENCE LISTING

Liao, Wei-Qiang

<120> HAIR CELL DISORDERS

<130> GENENT.035C1

<140> US 09/849,868

<141> 2001-05-04

<150> US 60/107,522

<151> 1998-11-07

<150> PCT/US99/25744

<151> 1999-10-28

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Lys Glu Gly Arg Gly Lys Gly Lys Gly Lys Lys Lys Glu Arg Gly Ser
50 55 60
Gly Lys Lys Pro Glu Ser Ala Ala Gly Ser Gln Ser Pro Ala Leu Pro
65 70 75 80
Pro Arg Leu Lys Glu Met Lys Ser Gln Glu Ser Ala Ala Gly Ser Lys
85 90 95
Leu Val Leu Arg Cys Glu Thr Ser Ser Glu Tyr Ser Ser Leu Arg Phe
100 105 110
Lys Trp Phe Lys Asn Gly Asn Glu Leu Asn Arg Lys Asn Lys Pro Gln
115 120 125
Asn Ile Lys Ile Gln Lys Lys Pro Gly Lys Ser Glu Leu Arg Ile Asn
130 135 140
Lys Ala Ser Leu Ala Asp Ser Gly Glu Tyr Met Cys Lys Val Ile Ser
145 150 155 160
Lys Leu Gly Asn Asp Ser Ala Ser Ala Asn Ile Thr Ile Val Glu Ser
165 170 175
Asn Glu Ile Ile Thr Gly Met Pro Ala Ser Thr Glu Gly Ala Tyr Val
180 185 190
Ser Ser Glu Ser Pro Ile Arg Ile Ser Val Ser Thr Glu Gly Ala Asn
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Phe	Met	Val	Lys	Asp	Leu	Ser	Asn	Pro	Ser	Arg	Tyr	Leu	Cys	Lys	Cys
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Gln	Pro	Gly	Phe	Thr	Gly	Ala	Arg	Cys	Thr	Glu	Asn	Val	Pro	Met	Lys
			260					265					270		
Val	Gln	Asn	Gln	Glu	Lys	Ala	Glu	Glu	Leu	Tyr	Gln	Lys	Arg	Val	Leu
		275					280					285			
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305					310					315					320
Arg	Leu	Arg	Gln	Ser	Leu	Arg	Ser	Glu	Arg	Asn	Asn	Met	Met	Asn	Ile
				325					330					335	
Ala	Asn	Gly	Pro	His	His	Pro	Asn	Pro	Pro	Pro	Glu	Asn	Val	Gln	Leu
			340					345					350		
Val	Asn	Gln	Tyr	Val	Ser	Lys	Asn	Val	Ile	Ser	Ser	Glu	His	Ile	Val
		355					360					365			
Glu	Arg	Glu	Ala	Glu	Thr	Ser	Phe	Ser	Thr	Ser	His	Tyr	Thr	Ser	Thr
370						375					380				
Ala	His	His	Ser	Thr	Thr	Val	Thr	Gln	Thr	Pro	Ser	His	Ser	Trp	Ser
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Asn	Gly	His	Thr	Glu	Ser	Ile	Leu	Ser	Glu	Ser	His	Ser	Val	Ile	Val
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Met	Ser	Ser	Val	Glu	Asn	Ser	Arg	His	Ser	Ser	Pro	Thr	Gly	Gly	Pro
			420					425					430		
Arg	Gly	Arg	Leu	Asn	Gly	Thr	Gly	Gly	Pro	Arg	Glu	Cys	Asn	Ser	Phe
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Leu	Arg	His	Ala	Arg	Glu	Thr	Pro	Asp	Ser	Tyr	Arg	Asp	Ser	Pro	His
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Val	Asp	Phe	His	Thr	Pro	Ser	Ser	Pro	Lys	Ser	Pro	Pro	Ser	Glu	Met
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			500					505					510		
Ser	Pro	Phe	Met	Glu	Glu	Glu	Arg	Pro	Leu	Leu	Leu	Val	Thr	Pro	Pro
		515					520					525			
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Leu	Arg	Ile	Val	Glu	Asp	Glu	Glu	Tyr	Glu	Thr	Thr	Gln	Glu	Tyr	Glu
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Ala	Ser	Leu	Glu	Ala	Thr	Pro	Ala	Phe	Arg	Leu	Ala	Asp	Ser	Arg	Thr

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Gln Ile Arg Lys * Gln Cys Leu Cys Gln Tyr His His Arg Gly Ile	
160 165 170	
aaa cga gat cat cac tgg tat gcc agc ctc aac tga agg agc ata tgt	577
Lys Arg Asp His His Trp Tyr Ala Ser Leu Asn * Arg Ser Ile Cys	
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gtc ttc aga gtc tcc cat tag aat atc agt atc cac aga agg agc aaa	625
Val Phe Arg Val Ser His * Asn Ile Ser Ile His Arg Arg Ser Lys	
190 195 200	
tac ttc ttc atc tac atc tac atc cac cac tgg gac aag cca tct tgt	673
Tyr Phe Phe Ile Tyr Ile Tyr Ile His His Trp Asp Lys Pro Ser Cys	
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aaa atg tgc gga gaa gga gaa aac ttt ctg tgt gaa tgg agg gga gtg	721
Lys Met Cys Gly Glu Gly Glu Asn Phe Leu Cys Glu Trp Arg Gly Val	
220 225 230	
ctt cat ggt gaa aga cct ttc aaa ccc ctc gag ata ctt gtg caa gtg	769
Leu His Gly Glu Arg Pro Phe Lys Pro Leu Glu Ile Leu Val Gln Val	
235 240 245	
cca acc tgg att cac tgg agc aag atg tac tga gaa tgt gcc cat gaa	817
Pro Thr Trp Ile His Trp Ser Lys Met Tyr * Glu Cys Ala His Glu	
250 255 260	
agt cca aaa cca aga aaa ggc gga gga gct gta cca gaa gag agt gct	865
Ser Pro Lys Pro Arg Lys Gly Gly Gly Ala Val Pro Glu Glu Ser Ala	
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gac cat aac cgg cat ctg cat cgc cct cct tgt ggt cgg cat cat gtg	913
Asp His Asn Arg His Leu His Arg Pro Pro Cys Gly Arg His His Val	
280 285 290 295	
tgt ggt ggc cta ctg caa aac caa gaa aca gcg gaa aaa gct gca tga	961
Cys Gly Gly Leu Leu Gln Asn Gln Glu Thr Ala Glu Lys Ala Ala *	
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ccg tct tcg gca gag cct tcg gtc tga acg aaa caa tat gat gaa cat	1009
Pro Ser Ser Ala Glu Pro Ser Val * Thr Lys Gln Tyr Asp Glu His	
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tgc caa tgg gcc tca cca tcc taa ccc acc ccc cga gaa tgt cca gct	1057
Cys Gln Trp Ala Ser Pro Ser * Pro Thr Pro Arg Glu Cys Pro Ala	
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ggg gaa tca ata cgt atc taa aaa cgt cat ctc cag tga gca tat tgt	1105
Gly Glu Ser Ile Arg Ile * Lys Arg His Leu Gln * Ala Tyr Cys	
345 350	
tga gag aga agc aga gac atc ctt ttc cac cag tca cta tac ttc cac	1153
* Glu Arg Ser Arg Asp Ile Leu Phe His Gln Ser Leu Tyr Phe His	
355 360 365	

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Ser Pro Ser Leu His Tyr Cys His Pro Asp Ser * Pro Gln Leu Glu	
370 375 380	
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Gln Arg Thr His * Lys His Pro Phe Arg Lys Pro Leu Cys Asn Arg	
385 390 395	
gat gtc atc cgt aga aaa cag tag gca cag cag ccc aac tgg ggg ccc	1297
Asp Val Ile Arg Arg Lys Gln * Ala Gln Gln Pro Asn Trp Gly Pro	
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aag agg acg tct taa tgg cac agg agg ccc tcg tga atg taa cag ctt	1345
Lys Arg Thr Ser * Trp His Arg Arg Pro Ser * Met * Gln Leu	
415 420 425	
cct cag gca tgc cag aga aac ccc tga ttc cta ccg aga ctc tcc tca	1393
Pro Gln Ala Cys Gln Arg Asn Pro * Phe Leu Pro Arg Leu Ser Ser	
430 435 440	
tag tga aag gta tgt gtc agc cat gac cac ccc ggc tcg tat gtc acc	1441
* * Lys Val Cys Val Ser His Asp His Pro Gly Ser Tyr Val Thr	
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Cys Arg Phe Pro His Ala Lys Leu Pro Gln Ile Ala Pro Phe Gly Asn	
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gtc tcc acc cgt gtc cag cat gac ggt gtc cat gcc ttc cat ggc ggt	1537
Val Ser Thr Arg Val Gln His Asp Gly Val His Ala Phe His Gly Gly	
475 480 485	
cag ccc ctt cat gga aga aga gag acc tct act tct cgt gac acc acc	1585
Gln Pro Leu His Gly Arg Arg Glu Thr Ser Thr Ser Arg Asp Thr Thr	
490 495 500	
aag gct gcg gga gaa gaa gtt tga cca tca ccc tca gca gtt cag ctc	1633
Lys Ala Ala Gly Glu Glu Val * Pro Ser Pro Ser Ala Val Gln Leu	
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ctt cca cca caa ccc cgc gca tga cag taa cag cct ccc tgc tag ccc	1681
Leu Pro Pro Gln Pro Arg Ala * Gln * Gln Pro Pro Cys * Pro	
520 525 530	
ctt gag gat agt gga gga tga gga gta tga aac gac cca aga gta cga	1729
Leu Glu Asp Ser Gly Gly * Gly Val * Asn Asp Pro Arg Val Arg	
535 540 545	
gcc agc cca aga gcc tgt taa gaa act cgc caa tag ccg gcg ggc caa	1777
Ala Ser Pro Arg Ala Cys * Glu Thr Arg Gln * Pro Ala Gly Gln	
550 555 560	
aag aac caa gcc caa tgg cca cat tgc taa cag att gga agt gga cag	1825
Lys Asn Gln Ala Gln Trp Pro His Cys * Gln Ile Gly Ser Gly Gln	

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caa cac aag ctc cca gag cag taa ctc aga gag tga aac aga aga tga						1873
Gln His Lys Leu Pro Glu Gln * Leu Arg Glu * Asn Arg Arg *						
	580		585			
aag agt agg tga aga tac gcc ttt cct ggg cat aca gaa ccc cct ggc						1921
Lys Ser Arg * Arg Tyr Ala Phe Pro Gly His Thr Glu Pro Pro Gly						
	590		595		600	
agc cag tct tga ggc aac acc tgc ctt ccg cct ggc tga cag cag gac						1969
Ser Gln Ser * Gly Asn Thr Cys Leu Pro Pro Gly * Gln Gln Asp						
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taa ccc agc agg ccg ctt ctc gac aca gga aga aat cca ggccaggctg						2018
* Pro Ser Arg Pro Leu Leu Asp Thr Gly Arg Asn Pro						
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tcacctgttaa aactttatatt tatataataa agtattccac cttaaattaa acaatttatt						2138
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Glu Arg Lys Glu Gly Arg Gly Lys Gly Lys Gly Lys Lys Glu Arg						
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Gly Ser Gly Lys Lys Pro Glu Ser Ala Ala Gly Ser Gln Ser Pro Ala						
	50		55		60	
Leu Pro Pro Gln Leu Lys Glu Met Lys Ser Gln Glu Ser Ala Ala Gly						
65	70		75		80	
Ser Lys Leu Val Leu Arg Cys Glu Thr Ser Ser Glu Tyr Ser Ser Leu						
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Arg Phe Lys Trp Phe Lys Asn Gly Asn Glu Leu Asn Arg Lys Asn Lys						
	100		105		110	
Pro Gln Asn Ile Lys Ile Gln Lys Lys Pro Gly Lys Ser Glu Leu Arg						
	115		120		125	
Ile Asn Lys Ala Ser Leu Ala Asp Ser Gly Glu Tyr Met Cys Lys Val						
	130		135		140	
Ile Ser Lys Leu Gly Asn Asp Ser Ala Ser Ala Asn Ile Thr Ile Val						
145	150		155		160	
Glu Ser Asn Glu Ile Thr Gly Met Pro Ala Ser Thr Glu Gly Ala						
	165		170		175	
Tyr Val Ser Ser Glu Ser Pro Ile Arg Ile Ser Val Ser Thr Glu Gly						
	180		185		190	
Ala Asn Thr Ser Ser Ser Thr Ser Thr Ser Thr Thr Gly Thr Ser His						
	195		200		205	

Leu	Val	Lys	Cys	Ala	Glu	Lys	Glu	Lys	Thr	Phe	Cys	Val	Asn	Gly	Gly	210	215	220
Glu	Cys	Phe	Met	Val	Lys	Asp	Leu	Ser	Asn	Pro	Ser	Arg	Tyr	Leu	Cys	225	230	235
Lys	Cys	Pro	Asn	Glu	Phe	Thr	Gly	Asp	Arg	Cys	Gln	Asn	Tyr	Val	Met	245	250	255
Ala	Ser	Phe	Tyr	Lys	His	Leu	Gly	Ile	Glu	Phe	Met	Glu	Ala	Glu	Glu	260	265	270
Leu	Tyr	Gln	Lys	Arg	Val	Leu	Thr	Ile	Thr	Gly	Ile	Cys	Ile	Ala	Leu	275	280	285
Leu	Val	Val	Gly	Ile	Met	Cys	Val	Val	Ala	Tyr	Cys	Lys	Thr	Lys	Lys	290	295	300
Gln	Arg	Lys	Lys	Leu	His	Asp	Arg	Leu	Arg	Gln	Ser	Leu	Arg	Ser	Glu	305	310	315
Arg	Asn	Asn	Met	Met	Asn	Ile	Ala	Asn	Gly	Pro	His	His	Pro	Asn	Pro	325	330	335
Pro	Pro	Glu	Asn	Val	Gln	Leu	Val	Asn	Gln	Tyr	Val	Ser	Lys	Asn	Val	340	345	350
Ile	Ser	Ser	Glu	His	Ile	Val	Glu	Arg	Glu	Ala	Glu	Thr	Ser	Phe	Ser	355	360	365
Thr	Ser	His	Tyr	Thr	Ser	Thr	Ala	His	His	Ser	Thr	Thr	Val	Thr	Gln	370	375	380
Thr	Pro	Ser	His	Ser	Trp	Ser	Asn	Gly	His	Thr	Glu	Ser	Ile	Leu	Ser	385	390	395
Glu	Ser	His	Ser	Val	Ile	Val	Met	Ser	Ser	Val	Glu	Asn	Ser	Arg	His	405	410	415
Ser	Ser	Pro	Thr	Gly	Gly	Pro	Arg	Gly	Arg	Leu	Asn	Gly	Thr	Gly	Gly	420	425	430
Pro	Arg	Glu	Cys	Asn	Ser	Phe	Leu	Arg	His	Ala	Arg	Glu	Thr	Pro	Asp	435	440	445
Ser	Tyr	Arg	Asp	Ser	Pro	His	Ser	Glu	Arg	Tyr	Val	Ser	Ala	Met	Thr	450	455	460
Thr	Pro	Ala	Arg	Met	Ser	Pro	Val	Asp	Phe	His	Thr	Pro	Ser	Ser	Pro	465	470	475
Lys	Ser	Pro	Pro	Ser	Glu	Met	Ser	Pro	Pro	Val	Ser	Ser	Met	Thr	Val	485	490	495
Ser	Met	Pro	Ser	Met	Ala	Val	Ser	Pro	Phe	Met	Glu	Glu	Glu	Arg	Pro	500	505	510
Leu	Leu	Leu	Val	Thr	Pro	Pro	Arg	Leu	Arg	Glu	Lys	Lys	Phe	Asp	His	515	520	525
His	Pro	Gln	Gln	Phe	Ser	Ser	Phe	His	His	Asn	Pro	Ala	His	Asp	Ser	530	535	540
Asn	Ser	Leu	Pro	Ala	Ser	Pro	Leu	Arg	Ile	Val	Glu	Asp	Glu	Glu	Tyr	545	550	555
Glu	Thr	Thr	Gln	Glu	Tyr	Glu	Pro	Ala	Gln	Glu	Pro	Val	Lys	Lys	Leu	565	570	575
Ala	Asn	Ser	Arg	Arg	Ala	Lys	Arg	Thr	Lys	Pro	Asn	Gly	His	Ile	Ala	580	585	590
Asn	Arg	Leu	Glu	Val	Asp	Ser	Asn	Thr	Ser	Ser	Gln	Ser	Ser	Asn	Ser	595	600	605
Glu	Ser	Glu	Thr	Glu	Asp	Glu	Arg	Val	Gly	Glu	Asp	Thr	Pro	Phe	Leu	610	615	620
Gly	Ile	Gln	Asn	Pro	Leu	Ala	Ala	Ser	Leu	Glu	Ala	Thr	Pro	Ala	Phe	625	630	635
Arg	Leu	Ala	Asp	Ser	Arg	Thr	Asn	Pro	Ala	Gly	Arg	Phe	Ser	Thr	Gln	640		

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Val Glu Ser Asn Glu Ile Ile Thr Gly Met Pro Ala Ser Thr Glu Gly			
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gca tat gtg tct tca gag tct ccc att aga ata tca gta tcc aca gaa			575
Ala Tyr Val Ser Ser Glu Ser Pro Ile Arg Ile Ser Val Ser Thr Glu			
	180	185	190
gga gca aat act tct tca tct aca tct aca tcc acc act ggg aca agc			623
Gly Ala Asn Thr Ser Ser Ser Thr Ser Thr Ser Thr Thr Gly Thr Ser			
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cat ctt gta aaa tgt gcg gag aag gag aaa act ttc tgt gtg aat gga			671
His Leu Val Lys Cys Ala Glu Lys Glu Lys Thr Phe Cys Val Asn Gly			
	210	215	220
ggg gag tgc ttc atg gtg aaa gac ctt tca aac ccc tcg aga tac ttg			719
Gly Glu Cys Phe Met Val Lys Asp Leu Ser Asn Pro Ser Arg Tyr Leu			
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Cys Lys Cys Pro Asn Glu Phe Thr Gly Asp Arg Cys Gln Asn Tyr Val			
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atg gcc agc ttc tac aag cat ctt ggg att gaa ttt atg gag gcg gag			815
Met Ala Ser Phe Tyr Lys His Leu Gly Ile Glu Phe Met Glu Ala Glu			
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gag ctg tac cag aag aga gtg ctg acc ata acc ggc atc tgc atc gcc			863
Glu Leu Tyr Gln Lys Arg Val Leu Thr Ile Thr Gly Ile Cys Ile Ala			
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ctc ctt gtg gtc ggc atc atg tgt gtg gtg gcc tac tgc aaa acc aag			911
Leu Leu Val Val Gly Ile Met Cys Val Val Ala Tyr Cys Lys Thr Lys			
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Lys Gln Arg Lys Lys Leu His Asp Arg Leu Arg Gln Ser Leu Arg Ser			
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gaa cga aac aat atg atg aac att gcc aat ggg cct cac cat cct aac			1007
Glu Arg Asn Asn Met Met Asn Ile Ala Asn Gly Pro His His Pro Asn			
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Pro Pro Pro Glu Asn Val Gln Leu Val Asn Gln Tyr Val Ser Lys Asn			
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Val Ile Ser Ser Glu His Ile Val Glu Arg Glu Ala Glu Thr Ser Phe			
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tcc acc agt cac tat act tcc aca gcc cat cac tcc act act gtc acc			1151

Ser Thr Ser His Tyr Thr Ser Thr Ala His His Ser Thr Thr Val Thr	
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Gln Thr Pro Ser His Ser Trp Ser Asn Gly His Thr Glu Ser Ile Leu	
385 390 395	
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Ser Glu Ser His Ser Val Ile Val Met Ser Ser Val Glu Asn Ser Arg	
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Gly Pro Arg Glu Cys Asn Ser Phe Leu Arg His Ala Arg Glu Thr Pro	
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Asp Ser Tyr Arg Asp Ser Pro His Ser Glu Arg Tyr Val Ser Ala Met	
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Thr Thr Pro Ala Arg Met Ser Pro Val Asp Phe His Thr Pro Ser Ser	
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Val Ser Met Pro Ser Met Ala Val Ser Pro Phe Met Glu Glu Glu Arg	
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Pro Leu Leu Leu Val Thr Pro Pro Arg Leu Arg Glu Lys Lys Phe Asp	
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His His Pro Gln Gln Phe Ser Ser Phe His His Asn Pro Ala His Asp	
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Ser Asn Ser Leu Pro Ala Ser Pro Leu Arg Ile Val Glu Asp Glu Glu	
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Tyr Glu Thr Thr Gln Glu Tyr Glu Pro Ala Gln Glu Pro Val Lys Lys	
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Ala Gly Ser Lys Leu Val Leu Arg Cys Glu Thr Ser Ser Glu Tyr Ser
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Ser Leu Arg Phe Lys Trp Phe Lys Asn Gly Asn Glu Leu Asn Arg Lys
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Asn Lys Pro Gln Asn Ile Lys Ile Gln Lys Lys Pro Gly Lys Ser Glu
85 90 95
Leu Arg Ile Asn Lys Ala Ser Leu Ala Asp Ser Gly Glu Tyr Met Cys
100 105 110
Lys Val Ile Ser Lys Leu Gly Asn Asp Ser Ala Ser Ala Asn Ile Thr
115 120 125
Ile Val Glu Ser Asn Glu Ile Thr Gly Met Pro Ala Ser Thr Glu
130 135 140
Gly Ala Tyr Val Ser Ser Glu Ser Pro Ile Arg Ile Ser Val Ser Thr
145 150 155 160
Glu Gly Ala Asn Thr Ser Ser Ser Thr Ser Thr Ser Thr Thr Gly Thr

				165					170					175			
Ser	His	Leu	Val	Lys	Cys	Ala	Glu	Lys	Glu	Lys	Thr	Phe	Cys	Val	Asn		
			180						185					190			
Gly	Gly	Glu	Cys	Phe	Met	Val	Lys	Asp	Leu	Ser	Asn	Pro	Ser	Arg	Tyr		
		195					200					205					
Leu	Cys	Lys	Cys	Pro	Asn	Glu	Phe	Thr	Gly	Asp	Arg	Cys	Gln	Asn	Tyr		
	210					215					220						
Val	Met	Ala	Ser	Phe	Tyr	Lys	Ala	Glu	Glu	Leu	Tyr	Gln	Lys	Arg	Val		
225					230					235					240		
Leu	Thr	Ile	Thr	Gly	Ile	Cys	Ile	Ala	Leu	Leu	Val	Val	Gly	Ile	Met		
			245						250					255			
Cys	Val	Val	Ala	Tyr	Cys	Lys	Thr	Lys	Lys	Gln	Arg	Lys	Lys	Leu	His		
		260						265					270				
Asp	Arg	Leu	Arg	Gln	Ser	Leu	Arg	Ser	Glu	Arg	Asn	Asn	Met	Met	Asn		
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Ile	Ala	Asn	Gly	Pro	His	His	Pro	Asn	Pro	Pro	Pro	Glu	Asn	Val	Gln		
	290					295					300						
Leu	Val	Asn	Gln	Tyr	Val	Ser	Lys	Asn	Val	Ile	Ser	Ser	Glu	His	Ile		
305					310					315					320		
Val	Glu	Arg	Glu	Ala	Glu	Thr	Ser	Phe	Ser	Thr	Ser	His	Tyr	Thr	Ser		
			325						330					335			
Thr	Ala	His	His	Ser	Thr	Thr	Val	Thr	Gln	Thr	Pro	Ser	His	Ser	Trp		
		340						345					350				
Ser	Asn	Gly	His	Thr	Glu	Ser	Ile	Leu	Ser	Glu	Ser	His	Ser	Val	Ile		
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Val	Met	Ser	Ser	Val	Glu	Asn	Ser	Arg	His	Ser	Ser	Pro	Thr	Gly	Gly		
	370					375					380						
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385					390					395					400		
Phe	Leu	Arg	His	Ala	Arg	Glu	Thr	Pro	Asp	Ser	Tyr	Arg	Asp	Ser	Pro		
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His	Ser	Glu	Arg	Tyr	Val	Ser	Ala	Met	Thr	Thr	Pro	Ala	Arg	Met	Ser		
		420						425					430				
Pro	Val	Asp	Phe	His	Thr	Pro	Ser	Ser	Pro	Lys	Ser	Pro	Pro	Ser	Glu		
	435						440					445					
Met	Ser	Pro	Pro	Val	Ser	Ser	Met	Thr	Val	Ser	Lys	Pro	Ser	Met	Ala		
	450					455					460						
Val	Ser	Pro	Phe	Met	Glu	Glu	Arg	Pro	Leu	Leu	Leu	Val	Thr	Pro			
465					470				475					480			
Pro	Arg	Leu	Arg	Glu	Lys	Lys	Phe	Asp	His	His	Pro	Gln	Gln	Phe	Ser		
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Ser	Phe	His	His	Asn	Pro	Ala	His	Asp	Ser	Asn	Ser	Leu	Pro	Ala	Ser		
		500						505					510				
Pro	Leu	Arg	Ile	Val	Glu	Asp	Glu	Glu	Tyr	Glu	Thr	Thr	Gln	Glu	Tyr		
	515						520					525					
Glu	Pro	Ala	Gln	Glu	Pro	Val	Lys	Lys	Leu	Ala	Asn	Ser	Arg	Arg	Ala		
	530					535					540						
Lys	Arg	Thr	Lys	Pro	Asn	Gly	His	Ile	Ala	Asn	Arg	Leu	Glu	Val	Asp		
545					550					555					560		
Ser	Asn	Thr	Ser	Ser	Gln	Ser	Ser	Asn	Ser	Glu	Ser	Glu	Thr	Glu	Asp		
			565					570						575			
Glu	Arg	Val	Gly	Glu	Asp	Thr	Pro	Phe	Leu	Gly	Ile	Gln	Asn	Pro	Leu		
		580						585					590				
Ala	Ala	Ser	Leu	Glu	Ala	Thr	Pro	Ala	Phe	Arg	Leu	Ala	Asp	Ser	Arg		
	595						600					605					

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Leu Ser Ser Val Ile Ala Asn Gln Asp Pro Ile Ala Val
625 630 635

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<213> Homo sapiens

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caggacgggtg ataacctctc cccgatcggg ttgcgagggc gccgggcaga ggccaggacg 180
cgagccgccg gcggcgggac ccatcgacga cttcccgggg cgacaggagc agccccgaga 240
gccagggcga gcgcccgttc caggtggccg gaccgcccgc cgcgtccgcg ccgcgctccc 300
tgcaggcaac gggagacgcc cccgcgcagc gcgagcgcct cagcgcggcc gctcgtcttc 360
cccatcgagg gacaaacttt tcccaaacc gatccgagcc cttggaccaa actcgcctgc 420
gccgagagcc gtccgcgtag agcgcctccgt ctccggcgag atg tcc gag cgc aaa 475
Met Ser Glu Arg Lys
1 5

gaa ggc aga ggc aaa ggg aag ggc aag aag aag gag cga ggc tcc ggc 523
Glu Gly Arg Gly Lys Gly Lys Gly Lys Lys Lys Glu Arg Gly Ser Gly
10 15 20

aag aag ccg gag tcc gcg gcg ggc agc cag agc cca gcc ttg cct ccc 571
Lys Lys Pro Glu Ser Ala Ala Gly Ser Gln Ser Pro Ala Leu Pro Pro
25 30 35

caa ttg aaa gag atg aaa agc cag gaa tcg gct gca ggt tcc aaa cta 619
Gln Leu Lys Glu Met Lys Ser Gln Glu Ser Ala Ala Gly Ser Lys Leu
40 45 50

gtc ctt cgg tgt gaa acc agt tct gaa tac tcc tct ctc aga ttc aag 667
Val Leu Arg Cys Glu Thr Ser Ser Glu Tyr Ser Ser Leu Arg Phe Lys
55 60 65

tgg ttc aag aat ggg aat gaa ttg aat cga aaa aac aaa cca caa aat 715
Trp Phe Lys Asn Gly Asn Glu Leu Asn Arg Lys Asn Lys Pro Gln Asn
70 75 80 85

atc aag ata caa aaa aag cca ggg aag tca gaa ctt cgc att aac aaa 763
Ile Lys Ile Gln Lys Lys Pro Gly Lys Ser Glu Leu Arg Ile Asn Lys
90 95 100

gca tca ctg gct gat tct gga gag tat atg tgc aaa gtg atc agc aaa 811
Ala Ser Leu Ala Asp Ser Gly Glu Tyr Met Cys Lys Val Ile Ser Lys
105 110 115

tta gga aat gac agt gcc tct gcc aat atc acc atc gtg gaa tca aac	859
Leu Gly Asn Asp Ser Ala Ser Ala Asn Ile Thr Ile Val Glu Ser Asn	
120 125 130	
gag atc atc act ggt atg cca gcc tca act gaa gga gca tat gtg tct	907
Glu Ile Ile Thr Gly Met Pro Ala Ser Thr Glu Gly Ala Tyr Val Ser	
135 140 145	
tca gag tct ccc att aga ata tca gta tcc aca gaa gga gca aat act	955
Ser Glu Ser Pro Ile Arg Ile Ser Val Ser Thr Glu Gly Ala Asn Thr	
150 155 160 165	
tct tca tct aca tct aca tcc acc act ggg aca agc cat ctt gta aaa	1003
Ser Ser Ser Thr Ser Thr Ser Thr Thr Gly Thr Ser His Leu Val Lys	
170 175 180	
tgt gcg gag aag gag aaa act ttc tgt gtg aat gga ggg gag tgc ttc	1051
Cys Ala Glu Lys Glu Lys Thr Phe Cys Val Asn Gly Gly Glu Cys Phe	
185 190 195	
atg gtg aaa gac ctt tca aac ccc tcg aga tac ttg tgc aag tgc cca	1099
Met Val Lys Asp Leu Ser Asn Pro Ser Arg Tyr Leu Cys Lys Cys Pro	
200 205 210	
aat gag ttt act ggt gat cgc tgc caa aac tac gta atg gcc agc ttc	1147
Asn Glu Phe Thr Gly Asp Arg Cys Gln Asn Tyr Val Met Ala Ser Phe	
215 220 225	
tac aag gcg gag gag ctg tac cag aag aga gtg ctg acc ata acc ggc	1195
Tyr Lys Ala Glu Glu Leu Tyr Gln Lys Arg Val Leu Thr Ile Thr Gly	
230 235 240 245	
atc tgc atc gcc ctc ctt gtg gtc ggc atc atg tgt gtg gtg gcc tac	1243
Ile Cys Ile Ala Leu Leu Val Val Gly Ile Met Cys Val Val Ala Tyr	
250 255 260	
tgc aaa acc aag aaa cag cgg aaa aag ctg cat gac cgt ctt cgg cag	1291
Cys Lys Thr Lys Lys Gln Arg Lys Lys Leu His Asp Arg Leu Arg Gln	
265 270 275	
agc ctt cgg tct gaa cga aac aat atg atg aac att gcc aat ggg cct	1339
Ser Leu Arg Ser Glu Arg Asn Asn Met Met Asn Ile Ala Asn Gly Pro	
280 285 290	
cac cat cct aac cca ccc ccc gag aat gtc cag ctg gtg aat caa tac	1387
His His Pro Asn Pro Pro Pro Glu Asn Val Gln Leu Val Asn Gln Tyr	
295 300 305	
gta tct aaa aac gtc atc tcc agt gag cat att gtt gag aga gaa gca	1435
Val Ser Lys Asn Val Ile Ser Ser Glu His Ile Val Glu Arg Glu Ala	
310 315 320 325	
gag aca tcc ttt tcc acc agt cac tat act tcc aca gcc cat cac tcc	1483
Glu Thr Ser Phe Ser Thr Ser His Tyr Thr Ser Thr Ala His His Ser	
330 335 340	

act act gtc acc cag act cct agc cac agc tgg agc aac gga cac act	1531
Thr Thr Val Thr Gln Thr Pro Ser His Ser Trp Ser Asn Gly His Thr	
345 350 355	
gaa agc atc ctt tcc gaa agc cac tct gta atc gtg atg tca tcc gta	1579
Glu Ser Ile Leu Ser Glu Ser His Ser Val Ile Val Met Ser Ser Val	
360 365 370	
gaa aac agt agg cac agc agc cca act ggg ggc cca aga gga cgt ctt	1627
Glu Asn Ser Arg His Ser Ser Pro Thr Gly Gly Pro Arg Gly Arg Leu	
375 380 385	
aat ggc aca gga ggc cct cgt gaa tgt aac agc ttc ctc agg cat gcc	1675
Asn Gly Thr Gly Gly Pro Arg Glu Cys Asn Ser Phe Leu Arg His Ala	
390 395 400 405	
aga gaa acc cct gat tcc tac cga gac tct cct cat agt gaa agg tat	1723
Arg Glu Thr Pro Asp Ser Tyr Arg Asp Ser Pro His Ser Glu Arg Tyr	
410 415 420	
gtg tca gcc atg acc acc ccg gct cgt atg tca cct gta gat ttc cac	1771
Val Ser Ala Met Thr Thr Pro Ala Arg Met Ser Pro Val Asp Phe His	
425 430 435	
acg cca agc tcc ccc aaa tcg ccc cct tcg gaa atg tct cca ccc gtg	1819
Thr Pro Ser Ser Pro Lys Ser Pro Pro Ser Glu Met Ser Pro Pro Val	
440 445 450	
tcc agc atg acg gtg tcc aag cct tcc atg gcg gtc agc ccc ttc atg	1867
Ser Ser Met Thr Val Ser Lys Pro Ser Met Ala Val Ser Pro Phe Met	
455 460 465	
gaa gaa gag aga cct cta ctt ctc gtg aca cca cca agg ctg cgg gag	1915
Glu Glu Glu Arg Pro Leu Leu Leu Val Thr Pro Pro Arg Leu Arg Glu	
470 475 480 485	
aag aag ttt gac cat cac cct cag cag ttc agc tcc ttc cac cac aac	1963
Lys Lys Phe Asp His His Pro Gln Gln Phe Ser Ser Phe His His Asn	
490 495 500	
ccc gcg cat gac agt aac agc ctc cct gct agc ccc ttg agg ata gtg	2011
Pro Ala His Asp Ser Asn Ser Leu Pro Ala Ser Pro Leu Arg Ile Val	
505 510 515	
gag gat gag gag tat gaa acg acc caa gag tac gag cca gcc caa gag	2059
Glu Asp Glu Glu Tyr Glu Thr Thr Gln Glu Tyr Glu Pro Ala Gln Glu	
520 525 530	
cct gtt aag aaa ctc gcc aat agc cgg cgg gcc aaa aga acc aag ccc	2107
Pro Val Lys Lys Leu Ala Asn Ser Arg Arg Ala Lys Arg Thr Lys Pro	
535 540 545	
aat ggc cac att gct aac aga ttg gaa gtg gac agc aac aca agc tcc	2155
Asn Gly His Ile Ala Asn Arg Leu Glu Val Asp Ser Asn Thr Ser Ser	

550	555	560	565	
cag agc agt aac tca gag agt gaa aca gaa gat gaa aga gta ggt gaa				2203
Gln Ser Ser Asn Ser Glu Ser Glu Thr Glu Asp Glu Arg Val Gly Glu				
	570	575	580	
gat acg cct ttc ctg ggc ata cag aac ccc ctg gca gcc agt ctt gag				2251
Asp Thr Pro Phe Leu Gly Ile Gln Asn Pro Leu Ala Ala Ser Leu Glu				
	585	590	595	
gca aca cct gcc ttc cgc ctg gct gac agc agg act aac cca gca ggc				2299
Ala Thr Pro Ala Phe Arg Leu Ala Asp Ser Arg Thr Asn Pro Ala Gly				
	600	605	610	
cgc ttc tcg aca cag gaa gaa atc cag gcc agg ctg tct agt gta att				2347
Arg Phe Ser Thr Gln Glu Glu Ile Gln Ala Arg Leu Ser Ser Val Ile				
	615	620	625	
gct aac caa gac cct att gct gta taaaacctaa ataaacacat agattcacct				2401
Ala Asn Gln Asp Pro Ile Ala Val				
	630	635		
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<211> 241

<212> PRT

<213> Homo sapiens

<400> 7

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	20	25	30	
Pro Ala Leu Pro Pro Gln Leu Lys Glu Met Lys Ser Gln Glu Ser Ala				
	35	40	45	
Ala Gly Ser Lys Leu Val Leu Arg Cys Glu Thr Ser Ser Glu Tyr Ser				
	50	55	60	
Ser Leu Arg Phe Lys Trp Phe Lys Asn Gly Asn Glu Leu Asn Arg Lys				
	65	70	75	80
Asn Lys Pro Gln Asn Ile Lys Ile Gln Lys Lys Pro Gly Lys Ser Glu				
	85	90	95	
Leu Arg Ile Asn Lys Ala Ser Leu Ala Asp Ser Gly Glu Tyr Met Cys				
	100	105	110	
Lys Val Ile Ser Lys Leu Gly Asn Asp Ser Ala Ser Ala Asn Ile Thr				
	115	120	125	
Ile Val Glu Ser Asn Glu Ile Thr Gly Met Pro Ala Ser Thr Glu				
	130	135	140	
Gly Ala Tyr Val Ser Ser Glu Ser Pro Ile Arg Ile Ser Val Ser Thr				
	145	150	155	160
Glu Gly Ala Asn Thr Ser Ser Ser Thr Ser Thr Ser Thr Thr Gly Thr				
	165	170	175	
Ser His Leu Val Lys Cys Ala Glu Lys Glu Lys Thr Phe Cys Val Asn				
	180	185	190	
Gly Gly Glu Cys Phe Met Val Lys Asp Leu Ser Asn Pro Ser Arg Tyr				

	195		200		205										
Leu	Cys	Lys	Cys	Pro	Asn	Glu	Phe	Thr	Gly	Asp	Arg	Cys	Gln	Asn	Tyr
	210				215					220					
Val	Met	Ala	Ser	Phe	Tyr	Ser	Thr	Ser	Thr	Pro	Phe	Leu	Ser	Leu	Pro
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Glu															

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<220>
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 cggcggcggc tgccggacga tgggagcgtg agcaggacgg tgataacctc tccccgatcg 180
 ggttgcgagg gcgcggggca gaggccagga cgcgagccgc cagcggcggg acccatcgac 240
 gacttccccg ggcgacagga gcagccccga gagccagggc gagcggccgt tccaggtggc 300
 cggaccgccc gccgcgtccg cgccgcgctc cctgcaggca acgggagacg cccccgcgca 360
 gcgcgagcgc ctccagcggg ccgctcgctc tccccatcga gggacaaaact tttcccaaac 420
 ccgatccgag cccttgagcc aaactcgctc gcgccgagag ccgtccgcgt agagcgtccc 480
 gtctccggcg ag atg tcc gag cgc aaa gaa ggc aga ggc aaa ggg aag ggc 531
 Met Ser Glu Arg Lys Glu Gly Arg Gly Lys Gly Lys Gly
 1 5 10

aag aag aag gag cga ggc tcc ggc aag aag ccg gag tcc gcg gcg ggc 579
 Lys Lys Lys Glu Arg Gly Ser Gly Lys Lys Pro Glu Ser Ala Ala Gly
 15 20 25

agc cag agc cca gcc ttg cct ccc caa ttg aaa gag atg aaa agc cag 627
 Ser Gln Ser Pro Ala Leu Pro Pro Gln Leu Lys Glu Met Lys Ser Gln
 30 35 40 45

gaa tcg gct gca ggt tcc aaa cta gtc ctt cgg tgt gaa acc agt tct 675
 Glu Ser Ala Ala Gly Ser Lys Leu Val Leu Arg Cys Glu Thr Ser Ser
 50 55 60

gaa tac tcc tct ctc aga ttc aag tgg ttc aag aat ggg aat gaa ttg 723
 Glu Tyr Ser Ser Leu Arg Phe Lys Trp Phe Lys Asn Gly Asn Glu Leu
 65 70 75

aat cga aaa aac aaa cca caa aat atc aag ata caa aaa aag cca ggg 771
 Asn Arg Lys Asn Lys Pro Gln Asn Ile Lys Ile Gln Lys Lys Pro Gly
 80 85 90

aag tca gaa ctt cgc att aac aaa gca tca ctg gct gat tct gga gag 819
 Lys Ser Glu Leu Arg Ile Asn Lys Ala Ser Leu Ala Asp Ser Gly Glu
 95 100 105

tat atg tgc aaa gtg atc agc aat tta gga aat gac agt gcc tct gcc	867
Tyr Met Cys Lys Val Ile Ser Lys Leu Gly Asn Asp Ser Ala Ser Ala	
110 115 120 125	
aat atc acc atc gtg gaa tca aac gag atc atc act ggt atg cca gcc	915
Asn Ile Thr Ile Val Glu Ser Asn Glu Ile Ile Thr Gly Met Pro Ala	
130 135 140	
tca act gaa gga gca tat gtg tct tca gag tct ccc att aga ata tca	963
Ser Thr Glu Gly Ala Tyr Val Ser Ser Glu Ser Pro Ile Arg Ile Ser	
145 150 155	
gta tcc aca gaa gga gca aat act tct tca tct aca tct aca tcc acc	1011
Val Ser Thr Glu Gly Ala Asn Thr Ser Ser Ser Thr Ser Thr Ser Thr	
160 165 170	
act ggg aca agc cat ctt gta aaa tgt gcg gag aag gag aaa act ttc	1059
Thr Gly Thr Ser His Leu Val Lys Cys Ala Glu Lys Glu Lys Thr Phe	
175 180 185	
tgt gtg aat gga ggg gag tgc ttc atg gtg aaa gac ctt tca aac ccc	1107
Cys Val Asn Gly Gly Glu Cys Phe Met Val Lys Asp Leu Ser Asn Pro	
190 195 200 205	
tcg aga tac ttg tgc aag tgc cca aat gag ttt act ggt gat cgc tgc	1155
Ser Arg Tyr Leu Cys Lys Cys Pro Asn Glu Phe Thr Gly Asp Arg Cys	
210 215 220	
caa aac tac gta atg gcc agc ttc tac agt acg tcc act ccc ttt ctg	1203
Gln Asn Tyr Val Met Ala Ser Phe Tyr Ser Thr Ser Thr Pro Phe Leu	
225 230 235	
tct ctg cct gaa taggagcatg ctcagttggt gctgctttct tgttgctgca	1255
Ser Leu Pro Glu	
240	
tctccctca gattccacct agagctagat gtgtcttacc agatctaata ttgactgcct	1315
ctgcctgtcg catgagaaca ttaacaaaag caattgtatt acttcctctg ttcgcgacta	1375
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caaagtctca cttttattga taaaataaaa atcattctac tgaacagtcc atcttcttta	1555
tacaatgacc acatcctgaa aagggtgttg ctaagctgta accgatatgc acttgaaatg	1615
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gttcagatgt ttttcttcat taaccaaaaa aaaaaaaaaa	1715

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 <211> 420
 <212> PRT
 <213> Homo sapiens

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 Glu Arg Gly Ser Gly Lys Lys Pro Glu Ser Ala Ala Gly Ser Gln Ser
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Ala	Gly	Ser	Lys	Leu	Val	Leu	Arg	Cys	Glu	Thr	Ser	Ser	Glu	Tyr	Ser	
	50					55					60					
Ser	Leu	Arg	Phe	Lys	Trp	Phe	Lys	Asn	Gly	Asn	Glu	Leu	Asn	Arg	Lys	
65					70					75					80	
Asn	Lys	Pro	Gln	Asn	Ile	Lys	Ile	Gln	Lys	Lys	Pro	Gly	Lys	Ser	Glu	
				85					90					95		
Leu	Arg	Ile	Asn	Lys	Ala	Ser	Leu	Ala	Asp	Ser	Gly	Glu	Tyr	Met	Cys	
			100					105					110			
Lys	Val	Ile	Ser	Lys	Leu	Gly	Asn	Asp	Ser	Ala	Ser	Ala	Asn	Ile	Thr	
		115					120					125				
Ile	Val	Glu	Ser	Asn	Glu	Ile	Ile	Thr	Gly	Met	Pro	Ala	Ser	Thr	Glu	
	130					135					140					
Gly	Ala	Tyr	Val	Ser	Ser	Glu	Ser	Pro	Ile	Arg	Ile	Ser	Val	Ser	Thr	
145					150					155					160	
Glu	Gly	Ala	Asn	Thr	Ser	Ser	Ser	Thr	Ser	Thr	Ser	Thr	Thr	Gly	Thr	
				165					170					175		
Ser	His	Leu	Val	Lys	Cys	Ala	Glu	Lys	Glu	Lys	Thr	Phe	Cys	Val	Asn	
			180					185					190			
Gly	Gly	Glu	Cys	Phe	Met	Val	Lys	Asp	Leu	Ser	Asn	Pro	Ser	Arg	Tyr	
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Leu	Cys	Lys	Cys	Pro	Asn	Glu	Phe	Thr	Gly	Asp	Arg	Cys	Gln	Asn	Tyr	
	210					215					220					
Val	Met	Ala	Ser	Phe	Tyr	Lys	Ala	Glu	Glu	Leu	Tyr	Gln	Lys	Arg	Val	
225					230					235					240	
Leu	Thr	Ile	Thr	Gly	Ile	Cys	Ile	Ala	Leu	Leu	Val	Val	Gly	Ile	Met	
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Cys	Val	Val	Ala	Tyr	Cys	Lys	Thr	Lys	Lys	Gln	Arg	Lys	Lys	Leu	His	
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Asp	Arg	Leu	Arg	Gln	Ser	Leu	Arg	Ser	Glu	Arg	Asn	Asn	Met	Met	Asn	
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Ile	Ala	Asn	Gly	Pro	His	His	Pro	Asn	Pro	Pro	Pro	Glu	Asn	Val	Gln	
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Leu	Val	Asn	Gln	Tyr	Val	Ser	Lys	Asn	Val	Ile	Ser	Ser	Glu	His	Ile	
305					310					315					320	
Val	Glu	Arg	Glu	Ala	Glu	Thr	Ser	Phe	Ser	Thr	Ser	His	Tyr	Thr	Ser	
				325					330					335		
Thr	Ala	His	His	Ser	Thr	Thr	Val	Thr	Gln	Thr	Pro	Ser	His	Ser	Trp	
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Ser	Asn	Gly	His	Thr	Glu	Ser	Ile	Leu	Ser	Glu	Ser	His	Ser	Val	Ile	
		355					360					365				
Val	Met	Ser	Ser	Val	Glu	Asn	Ser	Arg	His	Ser	Ser	Pro	Thr	Gly	Gly	
	370					375					380					
Pro	Arg	Gly	Arg	Leu	Asn	Gly	Thr	Gly	Gly	Pro	Arg	Glu	Cys	Asn	Ser	
385					390					395					400	
Phe	Leu	Arg	His	Ala	Arg	Glu	Thr	Pro	Asp	Ser	Tyr	Arg	Asp	Ser	Pro	
				405					410					415		
His	Ser	Glu	Arg													
			420													

<210> 10

<211> 2431

<212> DNA

<213> Homo sapiens

<220>

<221> CDS

<222> (496)...(1755)

<400> 10

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aaccgatcc gagcccttgg accaaactcg cctgcgccga gagccgtccg cgtagagcgc 480
tccgtctccg gcgag atg tcc gag cgc aaa gaa ggc aga ggc aaa ggg aag 531
          Met Ser Glu Arg Lys Glu Gly Arg Gly Lys Gly Lys
                1              5                  10
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ggc aag aag aag gag cga ggc tcc ggc aag aag ccg gag tcc gcg gcg 579
Gly Lys Lys Lys Glu Arg Gly Ser Gly Lys Lys Pro Glu Ser Ala Ala
          15              20              25
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ggc agc cag agc cca gcc ttg cct ccc caa ttg aaa gag atg aaa agc 627
Gly Ser Gln Ser Pro Ala Leu Pro Pro Gln Leu Lys Glu Met Lys Ser
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cag gaa tcg gct gca ggt tcc aaa cta gtc ctt cgg tgt gaa acc agt 675
Gln Glu Ser Ala Ala Gly Ser Lys Leu Val Leu Arg Cys Glu Thr Ser
          45              50              55              60
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tct gaa tac tcc tct ctc aga ttc aag tgg ttc aag aat ggg aat gaa 723
Ser Glu Tyr Ser Ser Leu Arg Phe Lys Trp Phe Lys Asn Gly Asn Glu
          65              70              75
```

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ttg aat cga aaa aac aaa cca caa aat atc aag ata caa aaa aag cca 771
Leu Asn Arg Lys Asn Lys Pro Gln Asn Ile Lys Ile Gln Lys Lys Pro
          80              85              90
```

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ggg aag tca gaa ctt cgc att aac aaa gca tca ctg gct gat tct gga 819
Gly Lys Ser Glu Leu Arg Ile Asn Lys Ala Ser Leu Ala Asp Ser Gly
          95              100             105
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gag tat atg tgc aaa gtg atc agc aaa tta gga aat gac agt gcc tct 867
Glu Tyr Met Cys Lys Val Ile Ser Lys Leu Gly Asn Asp Ser Ala Ser
          110             115             120
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gcc aat atc acc atc gtg gaa tca aac gag atc atc act ggt atg cca 915
Ala Asn Ile Thr Ile Val Glu Ser Asn Glu Ile Ile Thr Gly Met Pro
          125             130             135             140
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gcc tca act gaa gga gca tat gtg tct tca gag tct ccc att aga ata 963
Ala Ser Thr Glu Gly Ala Tyr Val Ser Ser Glu Ser Pro Ile Arg Ile
          145             150             155
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Ser Val Ser	Thr Glu Gly Ala Asn Thr Ser Ser Ser	Thr Ser Thr Ser	
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acc act ggg	aca agc cat ctt gta aaa tgt gcg gag	aag gag aaa act	1059
Thr Thr Gly	Thr Ser His Leu Val Lys Cys Ala Glu Lys	Glu Lys Thr	
175	180	185	
ttc tgt gtg	aat gga ggg gag tgc ttc atg gtg aaa gac	ctt tca aac	1107
Phe Cys Val	Asn Gly Gly Glu Cys Phe Met Val Lys Asp	Leu Ser Asn	
190	195	200	
ccc tcg aga	tac ttg tgc aag tgt cca aat gag ttt act	ggg gat cgc	1155
Pro Ser Arg	Tyr Leu Cys Lys Cys Pro Asn Glu Phe Thr	Gly Asp Arg	
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tgc caa aac	tac gta atg gcc agc ttc tac aag gcg gag	gag ctg tac	1203
Cys Gln Asn	Tyr Val Met Ala Ser Phe Tyr Lys Ala Glu	Glu Leu Tyr	
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cag aag aga	gtg ctg acc ata acc ggc atc tgc atc gcc	ctc ctt gtg	1251
Gln Lys Arg	Val Leu Thr Ile Thr Gly Ile Cys Ile Ala	Leu Leu Val	
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gtc ggc atc	atg tgt gtg gtg gcc tac tgc aaa acc aag	aaa cag cgg	1299
Val Gly Ile	Met Cys Val Val Ala Tyr Cys Lys Thr Lys	Lys Gln Arg	
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aaa aag ctg	cat gac cgt ctt cgg cag agc ctt cgg tct	gaa cga aac	1347
Lys Lys Leu	His Asp Arg Leu Arg Gln Ser Leu Arg Ser	Glu Arg Asn	
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aat atg atg	aac att gcc aat ggg cct cac cat cct aac	cca ccc ccc	1395
Asn Met Met	Asn Ile Ala Asn Gly Pro His His Pro Asn	Pro Pro Pro	
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gag aat gtc	cag ctg gtg aat caa tac gta tct aaa aac	gtc atc tcc	1443
Glu Asn Val	Gln Leu Val Asn Gln Tyr Val Ser Lys Asn	Val Ile Ser	
305	310	315	
agt gag cat	att gtt gag aga gaa gca gag aca tcc ttt	tcc acc agt	1491
Ser Glu His	Ile Val Glu Arg Glu Ala Glu Thr Ser Phe	Ser Thr Ser	
320	325	330	
cac tat act	tcc aca gcc cat cac tcc act act gtc acc	cag act cct	1539
His Tyr Thr	Ser Thr Ala His His Ser Thr Thr Val Thr	Gln Thr Pro	
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agc cac agc	tgg agc aac gga cac act gaa agc atc ctt	tcc gaa agc	1587
Ser His Ser	Trp Ser Asn Gly His Thr Glu Ser Ile Leu	Ser Glu Ser	
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cac tct gta	atc gtg atg tca tcc gta gaa aac agt agg	cac agc agc	1635
His Ser Val	Ile Val Met Ser Ser Val Glu Asn Ser Arg	His Ser Ser	
365	370	375	380

cca act ggg ggc cca aga gga cgt ctt aat ggc aca gga ggc cct cgt 1683
 Pro Thr Gly Gly Pro Arg Gly Arg Leu Asn Gly Thr Gly Gly Pro Arg
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gaa tgt aac agc ttc ctc agg cat gcc aga gaa acc cct gat tcc tac 1731
 Glu Cys Asn Ser Phe Leu Arg His Ala Arg Glu Thr Pro Asp Ser Tyr
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cga gac tct cct cat agt gaa agg taaaaccgaa ggcaaagcta ctgcagagga 1785
 Arg Asp Ser Pro His Ser Glu Arg
 415 420

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 ctttgtttga cggaacttat ttcttctgag cttctctcgt cgtcccagtg actgacaggc 1965
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 35 40 45
 Asp Gln Asp Ala Arg Leu Ala Tyr Gly Ser Arg Val Lys Asp Ile Val
 50 55 60
 Pro Gln Glu Ala Glu Glu Phe Cys Arg Thr Gly Ala Asn Phe Thr Leu
 65 70 75 80
 Arg Glu Leu Gly Leu Glu Glu Val Thr Pro Pro His Gly Thr Leu Tyr
 85 90 95
 Arg Thr Asp Ile Gly Leu Pro His Cys Gly Tyr Ser Met Gly Ala Gly
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 Ser Asp Ala Asp Met Glu Ala Asp Thr Val Leu Ser Pro Glu His Pro
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 Val Arg Leu Trp Gly Arg Ser Thr Arg Ser Gly Arg Ser Ser Cys Leu
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 Ser Ser Arg Ala Asn Ser Asn Leu Thr Leu Thr Asp Thr Glu His Glu
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 Asn Thr Glu Thr Asp His Pro Gly Gly Leu Gln Asn His Ala Arg Leu
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 Arg Thr Pro Pro Pro Pro Leu Ser His Ala His Thr Pro Asn Gln His
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His Ala Ala Ser Ile Asn Ser Leu Asn Arg Gly Asn Phe Thr Pro Arg
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 Ser Asn Pro Ser Pro Ala Pro Thr Asp His Ser Leu Ser Gly Glu Pro
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 Pro Ala Gly Gly Ala Gln Glu Pro Ala His Ala Gln Glu Asn Trp Leu
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 Leu Asn Ser Asn Ile Pro Leu Glu Thr Arg Asn Leu Gly Lys Gln Pro
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 Phe Leu Gly Thr Leu Gln Asp Asn Leu Ile Glu Met Asp Ile Leu Gly
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 Ala Ser Arg His Asp Gly Ala Tyr Ser Asp Gly His Phe Leu Phe Lys
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 Pro Gly Gly Thr Ser Pro Leu Phe Cys Thr Thr Ser Pro Gly Tyr Pro
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 Leu Thr Ser Ser Thr Val Tyr Ser Pro Pro Pro Arg Pro Leu Pro Arg
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 Ser Thr Phe Ala Arg Pro Ala Phe Asn Leu Lys Lys Pro Ser Lys Tyr
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 Cys Asn Trp Lys Cys Ala Ala Leu Ser Ala Ile Val Ile Ser Ala Thr
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 Ser Gly Glu Ile Asp Val Gly Arg Arg Ala Ser Gln Lys Ile Pro Pro
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 Gly Thr Phe Trp Arg Ser Gln Val Phe Ile Asp His Pro Val His Leu
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 Lys Phe Asn Val Ser Leu Gly Lys Ala Ala Leu Val Gly Ile Tyr Gly
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 Arg Lys Gly Leu Pro Pro Ser His Thr Gln Phe Asp Phe Val Glu Leu
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 Leu Asp Gly Arg Arg Leu Leu Thr Gln Glu Ala Arg Ser Leu Glu Gly
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 Thr Pro Arg Gln Ser Arg Gly Thr Val Pro Pro Ser Ser His Glu Thr
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 Gly Phe Ile Gln Tyr Leu Asp Ser Gly Ile Trp His Leu Ala Phe Tyr
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 Asn Asp Gly Lys Glu Ser Glu Val Val Ser Phe Leu Thr Thr Ala Ile
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 Ala Leu Pro Pro Arg Leu Lys Glu Met Lys Ser Gln Glu Ser Ala Ala
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 Lys Pro Gln Asn Ile Lys Ile Gln Lys Lys Pro Gly Lys Ser Glu Leu
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 Arg Ile Asn Lys Ala Ser Leu Ala Asp Ser Gly Glu Tyr Met Cys Lys

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Val	Ile	Ser	Lys	Leu	Gly	Asn	Asp	Ser	Ala	Ser	Ala	Asn	Ile	Thr	Ile
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Val	Glu	Ser	Asn	Glu	Ile	Ile	Thr	Gly	Met	Pro	Ala	Ser	Thr	Glu	Gly
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Ala	Tyr	Val	Ser	Ser	Glu	Ser	Pro	Ile	Arg	Ile	Ser	Val	Ser	Thr	Glu
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Gly	Ala	Asn	Thr	Ser	Ser	Ser	Thr	Ser	Thr	Ser	Thr	Thr	Gly	Thr	Ser
	690					695					700				
His	Leu	Val	Lys	Cys	Ala	Glu	Lys	Glu	Lys	Thr	Phe	Cys	Val	Asn	Gly
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Gly	Glu	Cys	Phe	Met	Val	Lys	Asp	Leu	Ser	Asn	Pro	Ser	Arg	Tyr	Leu
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Cys	Lys	Cys	Pro	Asn	Glu	Phe	Thr	Gly	Asp	Arg	Cys	Gln	Asn	Tyr	Val
			740					745				750			
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 cagggccac ggacattgct gactcttcag aacgtgctga catggagcca ggtagactga 180
 aattatcatg tgtccaaatt aaaattgcat acttcaagga ttatttgaag gactattctt 240
 agaccctttt aagaagattt aaagaaaaac cactcggccc tgagtgcggc gaggaccctg 300
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 Met Asp Val Lys Glu Arg Lys
 1 5

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Pro	Tyr	Arg	Ser	Leu	Thr	Arg	Arg	Arg	Asp	Ala	Glu	Arg	Arg	Tyr	Thr	
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agc	tcg	tcc	gcg	gac	agc	gag	gag	ggc	aaa	gcc	ccg	cag	aaa	tcg	tac	450
Ser	Ser	Ser	Ala	Asp	Ser	Glu	Gly	Lys	Ala	Pro	Gln	Lys	Ser	Tyr		
		25				30				35						

agc	tcc	agc	gag	acc	ctg	aag	gcc	tac	gac	cag	gac	gcc	cgc	cta	gcc	498
Ser	Ser	Ser	Glu	Thr	Leu	Lys	Ala	Tyr	Asp	Gln	Asp	Ala	Arg	Leu	Ala	
	40				45				50					55		

tat	ggc	agc	cgc	gtc	aag	gac	att	gtg	ccg	cag	gag	gcc	gag	gaa	ttc	546
Tyr	Gly	Ser	Arg	Val	Lys	Asp	Ile	Val	Pro	Gln	Glu	Ala	Glu	Glu	Phe	
				60				65					70			

tgc	cgc	aca	ggg	gcc	aac	ttc	acc	ctg	cgg	gag	ctg	ggg	ctg	gaa	gaa	594
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Cys	Arg	Thr	Gly	Ala	Asn	Phe	Thr	Leu	Arg	Glu	Leu	Gly	Leu	Glu	Glu		
			75					80					85				
gta	acg	ccc	cct	cac	ggg	acc	ctg	tac	cgg	aca	gac	att	ggc	ctc	ccc	642	
Val	Thr	Pro	Pro	His	Gly	Thr	Leu	Tyr	Arg	Thr	Asp	Ile	Gly	Leu	Pro		
		90					95					100					
cac	tgc	ggc	tac	tcc	atg	ggg	gct	ggc	tct	gat	gcc	gac	atg	gag	gct	690	
His	Cys	Gly	Tyr	Ser	Met	Gly	Ala	Gly	Ser	Asp	Ala	Asp	Met	Glu	Ala		
	105					110					115						
gac	acg	gtg	ctg	tcc	cct	gag	cac	ccc	gtg	cgt	ctg	tgg	ggc	cgg	agc	738	
Asp	Thr	Val	Leu	Ser	Pro	Glu	His	Pro	Val	Arg	Leu	Trp	Gly	Arg	Ser		
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Thr	Arg	Ser	Gly	Arg	Ser	Ser	Cys	Leu	Ser	Ser	Arg	Ala	Asn	Ser	Asn		
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ctc	aca	ctc	acc	gac	acc	gag	cat	gaa	aac	act	gag	act	gat	cat	ccg	834	
Leu	Thr	Leu	Thr	Asp	Thr	Glu	His	Glu	Asn	Thr	Glu	Thr	Asp	His	Pro		
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ggc	ggc	ctg	cag	aac	cac	gcg	cgg	ctc	cgg	acg	ccg	ccg	ccg	ccg	ctc	882	
Gly	Gly	Leu	Gln	Asn	His	Ala	Arg	Leu	Arg	Thr	Pro	Pro	Pro	Pro	Leu		
		170					175					180					
tcg	cac	gcc	cac	acc	ccc	aac	cag	cac	cac	gcg	gcc	tcc	att	aac	tcc	930	
Ser	His	Ala	His	Thr	Pro	Asn	Gln	His	His	Ala	Ala	Ser	Ile	Asn	Ser		
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Leu	Asn	Arg	Gly	Asn	Phe	Thr	Pro	Arg	Ser	Asn	Pro	Ser	Pro	Ala	Pro		
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Thr	Asp	His	Ser	Leu	Ser	Gly	Glu	Pro	Pro	Ala	Gly	Gly	Ala	Gln	Glu		
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cct	gcc	cac	gcc	cag	gag	aac	tgg	ctg	ctc	aac	agc	aac	atc	ccc	ctg	1074	
Pro	Ala	His	Ala	Gln	Glu	Asn	Trp	Leu	Leu	Asn	Ser	Asn	Ile	Pro	Leu		
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Glu	Thr	Arg	Asn	Leu	Gly	Lys	Gln	Pro	Phe	Leu	Gly	Thr	Leu	Gln	Asp		
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aac	ctc	att	gag	atg	gac	att	ctc	ggc	gcc	tcc	cgc	cat	gat	ggg	gct	1170	
Asn	Leu	Ile	Glu	Met	Asp	Ile	Leu	Gly	Ala	Ser	Arg	His	Asp	Gly	Ala		
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tac	agt	gac	ggg	cac	ttc	ctc	ttc	aag	cct	gga	ggc	acc	tcc	ccg	ctc	1218	
Tyr	Ser	Asp	Gly	His	Phe	Leu	Phe	Lys	Pro	Gly	Gly	Thr	Ser	Pro	Leu		
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Phe Cys Thr Thr Ser Pro Gly Tyr Pro Leu Thr Ser Ser Thr Val Tyr	
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Phe Asn Leu Lys Lys Pro Ser Lys Tyr Cys Asn Trp Lys Cys Ala Ala	
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Phe Val Ala Met His Leu Phe Gly Leu Asn Trp His Leu Gln Pro Met	
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Glu Gly Gln Met Tyr Glu Ile Thr Glu Asp Thr Ala Ser Ser Trp Pro	
380 385 390	
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Val Pro Thr Asp Val Ser Leu Tyr Pro Ser Gly Gly Thr Gly Leu Glu	
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Thr Pro Asp Arg Lys Gly Lys Gly Thr Thr Glu Gly Lys Pro Ser Ser	
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Phe Phe Pro Glu Asp Ser Phe Ile Asp Ser Gly Glu Ile Asp Val Gly	
425 430 435	
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Arg Arg Ala Ser Gln Lys Ile Pro Pro Gly Thr Phe Trp Arg Ser Gln	
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Val Phe Ile Asp His Pro Val His Leu Lys Phe Asn Val Ser Leu Gly	
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Lys Ala Ala Leu Val Gly Ile Tyr Gly Arg Lys Gly Leu Pro Pro Ser	
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His Thr Gln Phe Asp Phe Val Glu Leu Leu Asp Gly Arg Arg Leu Leu	
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Ser	Gly	Ile	Trp	His	Leu	Ala	Phe	Tyr	Asn	Asp	Gly	Lys	Glu	Ser	Glu	
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gtg	gtt	tcc	ttt	ctc	acc	act	gcc	att	gcc	ttg	cct	ccc	cga	ttg	aaa	2034
Val	Val	Ser	Phe	Leu	Thr	Thr	Ala	Ile	Ala	Leu	Pro	Pro	Arg	Leu	Lys	
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Glu	Met	Lys	Ser	Gln	Glu	Ser	Ala	Ala	Gly	Ser	Lys	Leu	Val	Leu	Arg	
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Cys	Glu	Thr	Ser	Ser	Glu	Tyr	Ser	Ser	Leu	Arg	Phe	Lys	Trp	Phe	Lys	
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Asn	Gly	Asn	Glu	Leu	Asn	Arg	Lys	Asn	Lys	Pro	Gln	Asn	Ile	Lys	Ile	
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Gln	Lys	Lys	Pro	Gly	Lys	Ser	Glu	Leu	Arg	Ile	Asn	Lys	Ala	Ser	Leu	
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gct	gat	tct	gga	gag	tat	atg	tgc	aaa	gtg	atc	agc	aaa	tta	gga	aat	2274
Ala	Asp	Ser	Gly	Glu	Tyr	Met	Cys	Lys	Val	Ile	Ser	Lys	Leu	Gly	Asn	
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gac	agt	gcc	tct	gcc	aat	atc	acc	atc	gtg	gaa	tca	aac	gag	atc	atc	2322
Asp	Ser	Ala	Ser	Ala	Asn	Ile	Thr	Ile	Val	Glu	Ser	Asn	Glu	Ile	Ile	
		650					655					660				
act	ggc	atg	cca	gcc	tca	act	gaa	gga	gca	tat	gtg	tct	tca	gag	tct	2370
Thr	Gly	Met	Pro	Ala	Ser	Thr	Glu	Gly	Ala	Tyr	Val	Ser	Ser	Glu	Ser	
	665					670					675					
ccc	att	aga	ata	tca	gta	tcc	aca	gaa	gga	gca	aat	act	tct	tca	tct	2418
Pro	Ile	Arg	Ile	Ser	Val	Ser	Thr	Glu	Gly	Ala	Asn	Thr	Ser	Ser	Ser	
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aca	tct	aca	tcc	acc	act	ggg	aca	agc	cat	ctt	gta	aaa	tgt	gcg	gag	2466
Thr	Ser	Thr	Ser	Thr	Thr	Gly	Thr	Ser	His	Leu	Val	Lys	Cys	Ala	Glu	
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aag	gag	aaa	act	ttc	tgt	gtg	aat	gga	ggg	gag	tgc	ttc	atg	gtg	aaa	2514
Lys	Glu	Lys	Thr	Phe	Cys	Val	Asn	Gly	Gly	Glu	Cys	Phe	Met	Val	Lys	
			715					720					725			
gac	ctt	tca	aac	ccc	tcg	aga	tac	ttg	tgc	aag	tgc	cca	aat	gag	ttt	2562
Asp	Leu	Ser	Asn	Pro	Ser	Arg	Tyr	Leu	Cys	Lys	Cys	Pro	Asn	Glu	Phe	

730 735 740

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 Thr Gly Asp Arg Cys Gln Asn Tyr Val Met Ala Ser Phe Tyr Ser Thr
 745 750 755

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 Ser Thr Pro Phe Leu Ser Leu Pro Glu
 760 765

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 Met Glu Ile Tyr Ser Pro Asp Met Ser
 1 5

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 Glu Val Ala Ala Glu Arg Ser Ser Ser Pro Ser Thr Gln Leu Ser Ala
 10 15 20 25

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 Asp Pro Ser Leu Asp Gly Leu Pro Ala Ala Glu Asp Met Pro Glu Pro
 30 35 40

cag act gaa gat ggg aga acc cct gga ctc gtg ggc ctg gcc gtg ccc 677
 Gln Thr Glu Asp Gly Arg Thr Pro Gly Leu Val Gly Leu Ala Val Pro
 45 50 55

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Glu Lys Ile Cys Ile Val Pro Ile Leu Ala Cys Leu Val Ser Leu Cys			
75	80	85	
ctc tgc atc gcc ggc ctc aag tgg gta ttt gtg gac aag atc ttt gaa			821
Leu Cys Ile Ala Gly Leu Lys Trp Val Phe Val Asp Lys Ile Phe Glu			
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Tyr Asp Ser Pro Thr His Leu Asp Pro Gly Gly Leu Gly Gln Asp Pro			
	110	115	120
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Ile Ile Ser Leu Asp Ala Thr Ala Ser Ala Val Trp Val Ser Ser			
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Gln Val Thr Val Gln Gly Asp Lys Ala Val Val Ser Phe Glu Pro Ser			
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Ala Ala Pro Thr Pro Lys Asn Arg Ile Phe Ala Phe Ser Phe Leu Pro			
170	175	180	185
tcc act gcg cca tcc ttc cct tca ccc acc cgg aac cct gag gtg aga			1109
Ser Thr Ala Pro Ser Phe Pro Ser Pro Thr Arg Asn Pro Glu Val Arg			
	190	195	200
acg ccc aag tca gca act cag cca caa aca aca gaa act aat ctc caa			1157
Thr Pro Lys Ser Ala Thr Gln Pro Gln Thr Thr Glu Thr Asn Leu Gln			
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act gct cct aaa ctt tct aca tct aca tcc acc act ggg aca agc cat			1205
Thr Ala Pro Lys Leu Ser Thr Ser Thr Ser Thr Thr Gly Thr Ser His			
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Leu Val Lys Cys Ala Glu Lys Glu Lys Thr Phe Cys Val Asn Gly Gly			
	235	240	245
gag tgc ttc atg gtg aaa gac ctt tca aac ccc tcg aga tac ttg tgc			1301
Glu Cys Phe Met Val Lys Asp Leu Ser Asn Pro Ser Arg Tyr Leu Cys			
	250	255	260
aag tgc cca aat gag ttt act ggt gat cgc tgc caa aac tac gta atg			1349
Lys Cys Pro Asn Glu Phe Thr Gly Asp Arg Cys Gln Asn Tyr Val Met			
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gcc agc ttc tac agt acg tcc act ccc ttt ctg tct ctg cct gaa			1394

Ala Ser Phe Tyr Ser Thr Ser Thr Pro Phe Leu Ser Leu Pro Glu
285 290 295

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Pro	Ala	Ala	Glu	Asp	Met	Pro	Glu	Pro	Gln	Thr	Glu	Asp	Gly	Arg	Thr
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Pro	Gly	Leu	Val	Gly	Leu	Ala	Val	Pro	Cys	Cys	Ala	Cys	Leu	Glu	Ala
	50				55						60				
Glu	Arg	Leu	Arg	Gly	Cys	Leu	Asn	Ser	Glu	Lys	Ile	Cys	Ile	Val	Pro
65					70					75				80	
Ile	Leu	Ala	Cys	Leu	Val	Ser	Leu	Cys	Leu	Cys	Ile	Ala	Gly	Leu	Lys
			85					90						95	
Trp	Val	Phe	Val	Asp	Lys	Ile	Phe	Glu	Tyr	Asp	Ser	Pro	Thr	His	Leu
			100					105						110	
Asp	Pro	Gly	Gly	Leu	Gly	Gln	Asp	Pro	Ile	Ile	Ser	Leu	Asp	Ala	Thr
		115				120						125			
Ala	Ala	Ser	Ala	Val	Trp	Val	Ser	Ser	Glu	Ala	Tyr	Thr	Ser	Pro	Val
	130					135					140				
Ser	Arg	Ala	Gln	Ser	Glu	Ser	Glu	Val	Gln	Val	Thr	Val	Gln	Gly	Asp
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Lys	Ala	Val	Val	Ser	Phe	Glu	Pro	Ser	Ala	Ala	Pro	Thr	Pro	Lys	Asn
			165						170					175	
Arg	Ile	Phe	Ala	Phe	Ser	Phe	Leu	Pro	Ser	Thr	Ala	Pro	Ser	Phe	Pro
			180					185					190		
Ser	Pro	Thr	Arg	Asn	Pro	Glu	Val	Arg	Thr	Pro	Lys	Ser	Ala	Thr	Gln
		195					200					205			
Pro	Gln	Thr	Thr	Glu	Thr	Asn	Leu	Gln	Thr	Ala	Pro	Lys	Leu	Ser	Thr
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Ser	Thr	Ser	Thr	Thr	Gly	Thr	Ser	His	Leu	Val	Lys	Cys	Ala	Glu	Lys
225					230					235					240
Glu	Lys	Thr	Phe	Cys	Val	Asn	Gly	Gly	Glu	Cys	Phe	Met	Val	Lys	Asp
			245						250					255	
Leu	Ser	Asn	Pro	Ser	Arg	Tyr	Leu	Cys	Lys	Cys	Pro	Asn	Glu	Phe	Thr
			260					265					270		
Gly	Asp	Arg	Cys	Gln	Asn	Tyr	Val	Met	Ala	Ser	Phe	Tyr	Ser	Thr	Ser
		275					280					285			
Thr	Pro	Phe	Leu	Ser	Leu	Pro	Glu								

290

295